

Oral drug delivery is considered an ideal administration route and offers multiple advantages for patients. However, innards challenges associated with gastrointestinal tract produce many challenges for an effective oral delivery. My research is majorly focused on developing a continuous method to produce lipid-based formulations such as Solid lipid nanoparticles, Micro-emulsions and Solid dispersions to overcome these challenges for oral delivery.

Current Projects:

Continuous Production of inhalation antibiotic formulation for the treatment of patient with cystic fibrosis

Cystic Fibrosis (CF) is a genetic disease with severe indications such as thick mucus making ciliary clearance of the trapped dust and bacteria out of the lungs difficult which builds up overtime and causes infections. Antibiotic treatment has proven to be successfully in controlling the gram-negative bacteria especially *Pseudomonas aeruginosa*, which predominates in CF associated chronic bacterial infections. In this project, we have prepared an inhalation therapy of antibiotic using continuous manufacturing technique, essential for local delivery of the drug at the site of infection and prevent frequent courses of intravenous or intramuscular antibiotics.

Development of Lipid based formulations for Pulmonary Delivery of Water Insoluble Drugs

With development of new and complex therapeutic molecules, there has been an increase in challenges associated with their formulations, especially owing to poor drug solubility, many times resulting in turn poor bioavailability. To overcome such challenges, lipid-based formulations have been extensively used for different drugs via different routes of administration. Pulmonary delivery route is one usually conceived for both systemic and local delivery of the drug, and offers several advantages, such as local delivery in the lungs, circumventing the first-pass metabolism and avoiding systemic toxicity. Aerosolization/inhalation of Lipid based formulations is currently being broadly studied and has huge potential for localized and targeted drug delivery in treatment of various diseases.